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EDITORIAL NOTES

AN EXCELLENT RECORD

THE American Gas Association held its twenty-fifth annual meeting towards the close of last year, and by all accounts it was a highly successful gathering. The Association was created in 1918 through the merging of organizations representing the technical, sales, and appliance manufacturing branches of the Industry, and the past quarter-century has brought great progress and many changes. The natural gas side has grown from serving 2,500,000 consumers in 1918 to 8,500,000 consumers in 1943; the manufactured gas side, while not enjoying such spectacular growth, gained 67% in consumers during this period. Total gas sales in 1942 showed an increase of nearly 250% over 1918. And in all this vast development work the A.G.A., on the activities of which we have often had cause to comment favourably in our columns, has played a leading part. The situation in 1918 required a united front and the subordination of individual objectives, and undoubtedly the A.G.A. has done much to present such a front. That more could be done in concert, however, was stressed by the President, Mr. Arthur Bridge, who called for greater unity in dealing with readjustments during the transition from war to peace—readjustments which in his opinion are likely to be drastic and unpleasant. In his own words, " only vision, intensive analysis, and careful planning can steer us safely through the ordeal of reconversion and accomplish a sound economic readjustment.

The President's Address, which we have read with much interest, was quiet in tone, not at all in the nature of a panegyric of the Association, not at all boastful. But his references to the Association's work did indicate how strong the A.G.A. has in fact become during the first twenty-five years of its life, and what virility marks its present mood. Under wartime conditions U.S.A. government departments have not been slow to seek its aid and have not been tardy in recognizing the help given. It has acted and continues to act smoothly as an alert and competent liaison. On the technical side the A.G.A. laboratories, the principal function of which in peacetime was the testing of gas appliances in the interest of the gas consumer, are now engaged largely on very different tasks of research and development in connexion with the war effort. But in addition to what we may term purely war work, the laboratories are carrying out a gas research programme on a scale greater than at any other time in their history—which is surely a matter for some envy as well as congratulation. During recent months further funds have been allocated to speeding up research on domestic utilization. Without entering into the question of what relationship exists between mass attack on specific problems and results achieved, we would mention that to-day, in the throes of war, this work is being conducted at a rate four times that of a few months ago. The staff has been augmented, for the most part by women graduates. The aim, of course, is improved appliances and technique when the war is over. No one, we think, would grudge what in this regard may be called the Association's luck. We ourselves, while congratulating the Association on its achievements during its first quarter of a century, admire the efficiency of its organization, and feel that we in this country stand to benefit by its work, the continued and growing success of which can be confidently anticipated.

CHEMISTS; SCOPE AND TRAINING

"CHAINING themselves to railings and throwing themselves under horses' hooves are supposed to have given women the vote, and so perhaps a certain amount of buffoonery and the holding of big meetings at which we tell the world how important chemists are will have some effect," though the Author of the words we have quoted apparently doubts it. The quotation is from the Address of Dr. L. H. Lampitt given on the presentation of the Medal of the Society of Chemical Industry some little time ago and published in *Chemistry and Industry* of Dec. 11 last. We suppose that many chemists in the Gas Industry have read the Address, which has interested us a good deal; perhaps many other gas chemists have not had the opportunity of reading it, and we would call their attention to it at a time when the scientist is being asked to prepare to play a larger role than formerly in the executive sphere. Dr. Lampitt had a good deal to say about the training of the chemist (and the work of the trained chemist becomes increasingly important to our Industry) and his sphere of action within industry. He insisted quite simply—and, we think, quite rightly—that a chemist should be essentially a chemist, which sounds trite but demands thought. Fundamentals first was the argument. By all means equip a chemist so that he can talk to the engineer or the works manager, but "a poor chemist with a smattering of knowledge of blue-prints is of little use to a commercial undertaking, and certainly of no use in a laboratory." On the other hand, the gravest menace to a chemist is the commercial man with a smattering of knowledge of science. In many cases the result is that the commercial man is sceptical of the chemist's findings and not, as one might expect, sympathetic with his point of view. But the chemist with a smattering of commercial knowledge is a yet greater menace to the firm employing him.

And here is something for chemists to think about. It is Dr. Lampitt's view that the training of the chemist does not fit him to become a politician, and that the very type of study he has made does not normally fit him to become an executive. On which point we should welcome the views of trained chemists within our Industry. The chemist, the argument ran, is an adviser, but chemistry has become the focal point of all sciences. Herein lies the greatest danger. "Chemistry has become so important that its practitioners have developed an exaggerated opinion of their own importance"; moreover, far too many have become chemists because it is a "cheap" profession to enter. The training is comparatively short, or at any rate is not too long, and immediate use can be made of it. Too few have the inward urge to carry out scientific work, a structure which applies equally to academic and industrial chemists. "Scientific training does not imply scientific thinking, and it is more scientific thinking that we need to-day."

And what import should we attach to the view that the development of large scientific organizations—national, academic, or commercial—does not improve matters? Is it a fact that the tendency in well-organized, efficient laboratories is to spoon-feed the worker, with consequent loss of initiative and stultification of imagination? We have no doubt that in the conduct of any

investigation one of the most important stimulants is reading round the subject. Does the provision of an efficient progressive information service make this unnecessary? As a consequence do investigations tend to follow one-track routes? Are specialists being bred at the expense of scientists? To which questions we add one more, and it is this: Can chemists learn to interpret themselves so that the lay mind knows what they are talking about?

HARVEST HOME

THE Gas Industry consummated the year 1943 with a great discovery; or so, apparently, it would have the world believe, for last Saturday, through the medium of a B.C.G.A. advertisement in *The Times*, it reported, "another record wartime harvest gathered in." Maybe the rest of the world had ceased months ago to marvel at this national triumph. But how fortunate! Our Industry had a booking of space in *The Times* of Dec. 31, and was thus able to hold its own harvest home celebration at least in the same year in which the harvest had been garnered.

And so the Gas Industry was able to lead the reader gently through "the vital part which fertilizers play in the nation's effort to feed itself," to "the vital importance, too, of the Gas Industry which produces more than 80,000 tons of fertilizers every year." It may be that this great harvest news had been delayed by intricate calculations, though actually we believe the average reader would equally have been satisfied with a mere approximation of 75,000 or 85,000. Let that be, and let us pass to the next announcement—that fertilizers are not the only field in which gas serves the nation. "It *serves* (the italics are theirs) by providing an efficient fuel for domestic cooking, warmth, hot water, and refrigeration . . ." Positively staggering, but that is not by any means all. It serves also "by feeding hungry furnaces forging multitudinous munitions of war . . . producing invaluable by-products—ammonia, benzole, sulphur, tar, and raw materials for plastics and dyes" (is there a daring hint of romance in that word "plastics?"). And it "*serves* (the italics again are theirs) with antiseptics, anaesthetics, drugs, and disinfectants" (and we bless the copy-writer for not specifying, in particular, our much-worn claim to aspirin).

And how does the advertisement endeavour to lure the reader on to this somewhat heavy, and certainly time-worn, literature? By the time-honoured device of a picture, of course, And so we perceive a pile of *legumes très ordinaires* (common-or-garden "veg." to those of us who patronize British restaurants) tastefully posed *à la* still life, surmounted by sheafs of corn daintily tied in the best show-bench tradition. And the background is a shadow drawing of the nowhere-on-earth gas-works which gives the impression of having filled its holder a year ago and, being unable to sell the gas, of having been closed down ever since. Possibly it is in hopes of paying the engineer's salary that the vegetables are on sale in the yard.

But are we alone in finding pictures of assorted vegetables uninspiring? If they are in black, as they must be in the daily Press, we cannot tell the carrots from the parsnips; if they are brilliant hued as in the seedsmen's catalogue—well, we positively don't believe it. And the letterpress of this advertisement concludes with "the amazing story of gas in wartime cannot now be told. When it can you will be glad that you saved all the gas you could." We, therefore, invite the people to look back to a bygone harvest, and forward to what? Well, we do offer them something if they are really virtuous and *if* they remember to ask, when it is all over, "What did you do in the world war Daddy Gas?"

We noticed recently an exactly equal space of *The Times* carrying another advertisement, simply stating: "On active service. The Minister of Munitions—Electricity. During the war we are stinting our homes of Electricity. But *after* the war—what electric service we can promise ourselves!"

We do not in the least disparage the Gas Industry's war effort, nor do we underrate the vital importance of the Food Front. Yet we do believe that the positive orgy of switch pressing (without need at the moment to worry about the bill) suggested by those last few words holds more allure than the virtuous contemplation of a pile of last season's vegetables. We believe, too, as we have urged on several occasions lately, that the direction of our Industry needs a new outlook and needs it quickly—an outlook which, among other things, has enough faith to offer the post-war home-maker something more glamorous than just "an efficient fuel."

Gas in Liberated Areas

Makers of gas-works plant and gas appliances in Great Britain will look forward to hearing more about the announcement from Washington that the Combined Production and Resources Board has formed a Public Utilities Committee to assemble all pertinent facts and recommend to the Board such action as may be advisable concerning requirements, supplies, and production of equipment to re-establish gas, electric, and water services in liberated and conquered areas. The Combined Production and Resources Board was formed some months ago as the result of conferences between Mr. Oliver Lyttelton and the production chiefs of Canada and the United States, and has its headquarters in Washington. Its purpose is to ensure that all the available raw materials of the United Nations are put to the best use in the interests of all the allied countries. The announcement of the appointment of the Public Utilities Committee was issued in Great Britain by the Ministry of Production simultaneously with similar announcements in the other countries affected.

Seeking enlightenment as to what contribution the new Committee might expect the gas plant manufacturers in Great Britain to make to this important aspect of post-war reconstruction, we asked the Ministry for further details, but were told that there was nothing to add at the moment. The Ministry had acted solely as a medium for the issue of the announcement in this country and knew nothing more than was contained in the formal Press statement. It was agreed at the Atlantic City meeting of Unrra that the requirements of liberated areas sponsored by Unrra would be referred to the Combined Boards for consideration in relation to other military or civilian claims for the same supplies. It will be for the Combined Boards to make recommendations on how far the requirements put forward by Unrra can be met, and from what sources. The new Public Utilities Committee will assist the Combined Production and Resources Board to perform this task in its particular field. The chairman of the committee, an American member, will be Mr. J. A. Krug, Director of the Office of War Utilities, W.P.B. The member for Great Britain will be Sir Henry Self for the time being. The member for Canada will be Dr. T. H. Hogg, chairman of the Hydro Electric Power Commission of Ontario.

Personal

New Year Honours

Among those whose names are in the Honours List are: Brig.-Gen. Sir Harold Hartley, F.R.S., who has been appointed to the Order of K.C.V.O. Mr. Samuel Tagg, J.P., Managing Director of the Preston Gas Company, receives the C.B.E. He is a past-president of The Institution of Gas Engineers. Another past-president of the Institution, Colonel H. C. Smith, J.P., receives the same Honour in the Military Division. The O.B.E. is awarded to Dr. J. G. King, Director of the Gas Research Board, and the M.B.E. to Miss Wooster, General Secretary, London and Counties Coke Association.

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Mr. J. S. THORMAN, who retired on Dec. 31 last from the service of the Gas Light and Coke Company, served his pupilship with the West Ham Gas Company under his father, Mr. John Thorman, Engineer and Manager, and was appointed Assistant Engineer at West Ham in 1897. When the Gas Light and Coke Company took over the Company, he was transferred to Beckton as Assistant Engineer, and in 1918 he was appointed Deputy Station Engineer there. In 1920 he was appointed Engineer at Bow Common, and in 1923 was transferred to Stratford as Engineer. Mr. Thorman was appointed as Engineer at the Southall Works when the Brentford Company was taken over by the Gas Light and Coke Company, and this works was reconstructed under his supervision, with the introduction of intermittent vertical chambers. In 1936 he was appointed Engineer of the Fulham Works, and in 1941 Deputy Chief Engineer of the Company.

Mr. Thorman was a pioneer in the introduction of waste heat boilers in conjunction with carbonizing plant, and read a Paper in

November, 1923, on this subject, giving his experience with the installation of waste heat boilers erected that year at Stratford Works for the recovery of waste heat from Glover-West verticals. He was awarded the Gold Medal of The Institution of Gas Engineers for his Paper read in 1931 on Intermittent Verticals at Southall.

For two years Mr. Thorman was Chairman and Chief Examiner in Gas Engineering of The Institution of Gas Engineers' Education Scheme.

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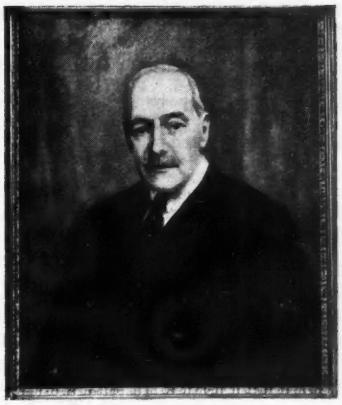
Sir John Daw

In recognition of "outstanding services to his native county" Sir JOHN E. DAW, J.P., C.A., Chairman of the Exeter Gas Company, was presented on Dec. 9 by the Devon County Council with his portrait in oils, together with a Georgian silver inkstand and an album containing the names of subscribers. Sir John's public life began with his election



to the Exeter City Council in 1889, and his election to the Devon County Council took place in 1925. His elevation to the aldermanic bench was followed by election to the vice-chairmanship and then to the chair in 1937.

Sir John has been a trustee of the National Gas Council since 1933, is a member of the Central Executive Board of the N.G.C., a Past-President of the British Commercial Gas Association, and Chairman of the Staff Pensions Advisory Committee of the National Gas Associations.

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Mr. GEORGE LANE has recently retired from Messrs. Willey & Company Ltd., after 58½ years' service, with 38 years as Secretary. He served under three generations, that of Mr. Henry Willey, Mr. Henry A. Willey, and Mr. Thornton Willey. Mr. Stephen Simpson, Chairman of the Company, on behalf of the Directors and Staff presented Mr. Lane with a cheque. Mr. Lane was Secretary of the Devon Gas Association, Ltd., for 36 years (since its inception), and is now a Director of that Company.

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At the Annual Dinner of the Nantwich Gas Company Mr. HAROLD VERNON, the Company's Manager, who is shortly retiring, was presented with a clock by the staff. Mr. Vernon has been the Engineer, Manager, and Secretary at Nantwich for more than 25 years.

Among the guests at the dinner was Mr. A. S. BRUSH, who is to succeed Mr. Vernon.

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Mr. R. C. WARDELL, B.Sc.(Eng.), Assistant Engineer and Manager to the Peterborough Gas Company, has been appointed Engineer and Manager to the Boston Gas Light and Coke Company in succession to Mr. W. C. CHAPMAN, who has retired owing to ill-health, but is retaining his seat on the Board. Mr. Wardell obtained his practical and technical training with Messrs. West's Gas Improvement Company, Ltd., and was appointed Technical Assistant at Peterborough in 1933 and Assistant Engineer and Manager in 1937. He takes up his new appointment this month.

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Mr. ERNEST ABLETT, Engineer, Manager, and Secretary of the Swansea Gas Light Company, has been appointed a Director of the Company.

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Mr. G. K. MARCH, for more than twenty years Principal Representative for the Midland Brass Fittings Company, Ltd., of Aston Road, Birmingham, has been appointed a Director. The other Directors are Mr. G. R. Morris (Chairman) and Mr. A. L. Chapman.

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Mr. EDWIN D. WHITELOCK, M.I.Chem.E., Chief Engineer, and Mr. LAWRENCE WEAVER, Commercial Manager, have been appointed Directors of Messrs. Brotherton & Co., Ltd. Mr. F. H. S. McDavid, C.A., has been appointed Deputy Chairman.

Obituary

Sir Russell Bencraft

We briefly announced last week the death, after a long illness, of Sir HENRY RUSSELL BENCRAFT, M.R.C.S., L.R.C.P., J.P., on Christmas Day in his 86th year. For the past 50 years he was one of the most prominent of Southampton's citizens. His association with the Southampton Gaslight and Coke Company began many years ago. He became a Director in 1914 and was appointed Chairman of the Board in 1928. In 1927 he was President of the British Commercial Gas Association. Sir Russell, whose activities in public life covered a wide field, was created a knight in 1924. The funeral took place on Dec. 30, and the attendance was very large indeed. Among those representing the Gas Company were Brigadier E. M. Jack, C.B., C.M.G., D.S.O., D.L. (Deputy Chairman), Messrs. A. W. Oke, T. Carmichael, J.P., and H. W. Warren (Directors), S. E. Whitehead, J.P. (Director, General Manager, and Engineer), and H. Runham (Secretary and Accountant). Colonel H. W. Woodall, Regional Controller, Ministry of Fuel and Power, attended, and others associated with the Gas Industry who were present included Dr. E. W. Smith, C.B.E. (representing the Woodall-Duckham Companies and the Institute of Fuel), Mr. W. J. Smith (B.G.F., N.G.C., and B.C.G.A.), and Mr. P. G. G. Moon and Mr. J. T. Haynes (Bournemouth Gas and Water Company).

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The death occurred on Dec. 21 of Mr. WILLIAM BUCKLEY, who was widely known and greatly liked in the North of England, where he endeared himself to a long succession of young men who attended the classes in gas manufacture which he conducted at the Manchester Municipal College of Technology for many years. Mr. Buckley, who was 73 years of age, entered the service of the Manchester Corporation Gas Department as Chemist in 1889 and became Manager of the Droylsden Gas-Works in 1916, which was run as an experimental station, from which position he retired in 1930 at the age of 60. Here he regularly received pupils of Messrs. West's Gas Improvement Company who, by arrangement with the Manchester Corporation, were permitted to take a course of instruction in works management from the technical point of view as a finish to their training, and many men now well placed in the Industry remember him with respect and affection. Mr. Buckley was elected a member of The Institution of Gas Engineers in 1928, was a member (one might almost say *ex officio*) of the Education Committee of the Manchester and District Association of Gas Engineers, and did much valuable work in the District, particularly in connexion with street lighting.

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Mr. JOHN BALDWIN, formerly Engineer and Manager of the Gainsborough Gas Undertaking, has died at Bradford, aged 81.

Letters to the Editor

Benzole Recovery

DEAR SIR,—With reference to the letter from "Another Benzole Recoverer" in your issue of Dec. 22, the following may serve to clear up the points raised in connexion with my recent contribution:

The figure of 1,000 cu.ft. per ton used is made up of 40 cu.ft., being the gaseous volume of 1 gallon of benzole, plus 960 cu.ft., being the amount of water gas which can be added when benzole is not recovered, the calorific value remaining constant.

While it is true to say that an increase in make in the region of 1,000 cu.ft. of gas per ton of coal per gallon benzole may be obtained when not recovering benzole, it does not follow that a *pro rata* increase in total gas made will result, as the increased steaming necessary to maintain calorific value will require lower coal throughput per retort.

Your correspondent also mentioned the cost of water. The water used is pumped from an adjacent river and thus the pumping charges represent the total cost.

The figures given by your correspondent are very interesting. Perhaps you will allow me to raise one point—*viz.*, the difference of 31.52 B.Th.U. between stripped gas and gas as made. It seems high, a figure of approximately 9 B.Th.U. per gallon of benzole being more usual.

Yours faithfully,

Dec. 24, 1943. "A SCOTTISH GAS ENGINEER."

Letters to the Editor (cont.)

Benzole Recovery

DEAR SIR,—Your correspondent, "Another Benzole Recoverer," in your issue of Dec. 22, 1943, gives some interesting performance figures for benzole recovery at his works for 1943. There is, however, a serious discrepancy in his figures which calls for correction or some explanation. He admits an allowance of 1.5 therms per gallon of benzole recovered; and this is confirmed when his difference (1,931 therms) between the therms made (522,288) and the therms sent out (520,357) is divided by the number of gallons of benzole recovered (12,647), the result being 1.53 therms per gallon. He shows, however, a reduction in C.V. by stripping from 462 to 430 (I refrain from copying his achievement of quoting C.V. to the second place of decimals!)—*i.e.*, about 32 B.Th.U./cu.ft., which when multiplied by the make of gas per ton (17,000 cu.ft.) shows a loss of 5.4 therms per ton of coal carbonized. This is double the figure obtained from the actual benzole he recovered per ton of coal ($1.77 \times 1.53 = 2.7$). Where have the other 2.7 therms per ton been lost?

The reduction in C.V. should apparently be in the region of 15 or 16 B.Th.U./cu.ft. for the degree of stripping shown.

The theoretical reduction of C.V. by stripping varies between 7 and 11 B.Th.U. per cu.ft. per gallon of benzole removed (depending upon C.V. of gas and make per ton), and it would be very interesting and useful to hear from more of your readers with benzole recovery experience to what extent this is being confirmed in practice.

"Another Benzole Recoverer" has also obviously mistaken the figure quoted by "Scottish Gas Engineer" for reduction of gas yield per ton of coal carbonized. The figure of 1,000 cu.ft. per ton does not refer to actual gas removed as benzole vapour, but to the approximate reduction of make/ton by reduced steaming of the coal (in, say, continuous vertical retorts) so as to produce the higher C.V. gas required for stripping down to the declared C.V.

Yours faithfully,

Dec. 28, 1943. "BEN SEAN."

Diary

Jan. 11.—N.G.C. C.E.B.: Gas Industry House, 2.15 p.m.
Jan. 11.—National Federation of Gas Coke Associations: General Committee, Gas Industry House, 9.45 a.m.
Jan. 15.—Scottish Junior Gas Association, Edinburgh.
Jan. 17.—London and Counties Coke Association: Finance Committee, 11 a.m.; Executive Committee, 11.30 a.m.; Central Committee, 1.30 p.m.; Gas Industry House.
Jan. 18.—Illuminating Engineering Society: Meeting with the R.I.B.A. at 66, Portland Place, W. 1, 5.30 p.m. Discussion on the place of science in the art of lighting.

American Thought Trend

[Contributed]

The whole proceedings of the 25th Annual Meeting of the American Gas Association were overshadowed by considerations arising out of the conditions imposed by the war effort and, equally of course, these conditions are not paralleled by those in which our own Gas Industry functions. Still, there are some facts and ideas which are of interest and may be instructive to us in Great Britain.

The new markets for natural gas are not without their anxieties. "The drilling of new gas wells," says Mr. Burt R. Bay, Chairman of the Natural Gas Section, "has not kept pace with the rate of withdrawals of gas during the last two years." But this does not damp Mr. Bay's optimism. Here are some interesting estimates from his Address. Of the total annual heat energy requirements expressed in terms of coal equivalent, the coal industry will produce more than 50% of the year's requirements, the oil industry 30%, and the Natural Gas Industry between 11 and 12%. As to the future, the possibilities for his Industry are "measured only by our own efforts." It requires no stretch of imagination to say that in almost every community where natural gas is supplied there are possibilities for the further expansion of domestic and commercial cooking, water heating, and particularly space-heating markets."

The Report of the Post-War Planning Committee was presented by the vigorous Mr. A. M. Beebee, of Rochester, N.Y. It is mainly concerned with the potential markets of the post-war period and the means to be adopted to capture them, and finally with the effects of national planning "which may affect the general picture." Once again the emphasis is on the domestic house-heating load, the importance of which is shown by the fact that "70% of the sales and 80% of the revenue comes from the domestic load, while in the natural gas branch of the Industry it provides 55% of the revenue." The ultimate view of the Industry is directed to a time "when we must look to coal as our biggest source of energy" and to "the making of the energy in coal available in ashless form, in the most convenient form needed for society, which is gas distributed in pipes for non-mobile heat requirements and in the form of liquid fuels for motor and airplane use." In the field of research Mr. Beebee's Committee recommends an appointment comparable to the Director of Research of the British Gas Association. It is interesting to note that even in America, where we thought that unity of direction had reached a very high level, the call is still for "a United Gas Industry."

Other reports cover food and nutrition—"analysis of the garbage figures of American cities shows an average of 300 lb. per person of food refuse per year. Of this amount 225 lb. has been estimated to be edible." "Our task will be to make sure worn-out equipment is replaced with new gas equipment instead of some competitive fuel equipment." "There will be an important need for training men to use gas who have been trained by Uncle Sam on ships to use electric service and who have never used gas." "There is no class of business that produces a year round gas load with better load factor characteristics than the food service business."

The reports of Technical Committees are more severe in tone. The Chemical Committee rubs in the warning that "only a 13 to 15 years' supply of petroleum is reported to be available, and as the years progress and the supply reduces, the prices of the oil and the oil products will continue to rise." The problem of sulphur removal is visualized as one of complete removal—not the reduction to 3% which we contemplate here.

Both the text-books are under revision. *Fuel-Flue Gases*, the new edition of which appeared in 1940, has sold 1,000 copies and another revision is already contemplated. Two instalments of the revised *Gas Chemist's Handbook* are finished and one, that on Light Oil and Light Oil Products, has been published, while the other, on Dry-Purification, is in the hands of the printer, and nine others are well in hand.

House Coal Supplies

The Ministry of Fuel and Power announce that in view of the present supply position, and the need for providing against future coal requirements for military operations, it has become necessary to reduce supplies of house coal for current consumption, and to direct that stocks in merchants' yards shall be reserved for use in future periods when supplies may be interrupted. Reserve stocks in merchants' yards cannot therefore be regarded as necessarily available for distribution. The *maximum* supply of house and kitchen coal to any domestic or other controlled premises during the month of January will be 4 cwt. in the South of England and 5 cwt. in the North. In some districts as the maximum quantity will not be generally available, merchants have been instructed to restrict deliveries according to the supply position.

Persons whose stock exceeds one ton are prohibited from obtaining any coal, and no person may obtain a quantity which would raise his stock above one ton. In parts of the Eastern region where transport difficulties are acute, the stock limit will be 5 cwt. instead of one ton.

Small anthracite and Welsh dry steam coal, or manufactured fuels, may be obtained if available up to a maximum of 10 cwt. during January, provided that no consumer raises his total stock of these fuels above 30 cwt.

Coke and large anthracite remain free of restriction.

The Employees of the Newcastle and Gateshead Gas Company have raised by weekly contributions during the year £1,061 in aid of medical charities. Over 40 hospitals and institutions will benefit.

A Lecture on a Chemical Engineering subject has been endowed by Mr. J. Arthur Reavell, and will be given under the auspices of the Institution of Chemical Engineers. The lecture will be known as "The J. Arthur Reavell Lecture," and will be delivered not less frequently than once in every four years.

It is regretted that the meeting of the Institute of Fuel called for Jan. 20 in London, when a Paper by Mr. John Roberts was to be given, has had to be cancelled. A meeting to inaugurate a new District Section of the Institute will be held on Friday, Jan. 21, at 5.45 p.m., in the Royal Technical College, Glasgow, when the President, Dr. E. W. Smith, C.B.E., will give an Address on "Education in the Fuel Industries," to be followed by a discussion. Professor A. M. Bryan, J.P., will take the Chair.

In Time synthetic rubber may be as good as natural, states the British Rubber Federation in a detailed review of its work during the war. The Federation regards the American make of synthetic rubber as one of the war's "colossal achievements." Early in 1944 the whole output of the British rubber industry will consist of three-quarters of synthetic to only one-quarter of natural rubber. The technical staffs of the Federation's 289 members have been working for Rubber Control without payment through a Technical Advisory Committee under the chairmanship of Mr. S. A. Brazier, Manager of Dunlop's technical department in Manchester.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

POST-WAR PLANNING OF THE GAS INDUSTRY

Interim Report of a Sub-Committee appointed by a Special Committee of the Association of Municipal Corporations

1. In November, 1941, the then President of the Board of Trade approached the British Gas Federation with a request that consideration should be given to the post-war planning of the Gas Industry by the Industry itself, and asked the Federation to prepare a report on this matter, making it clear that the report should not shirk the political aspects of the planning of the Industry. As a result of this request the British Gas Federation set up a Post-war Planning Committee with the following terms of reference:

> "To collect and collate relevant information and to consider the steps to be taken by the Industry to place it upon such a basis that it can best meet the altered conditions of the future and make the largest possible contribution to national and social welfare and to report to the constituent bodies."

The Post-War Planning Committee has now prepared its Report, which has been adopted by the Council of the Federation and submitted to all gas undertakings who are members of the Federation. In para. 1 the Report states that it has been agreed by an overwhelming majority at district meetings specially convened that the Report may be submitted to the Minister of Fuel and Power.

2. At most of these district meetings, we are informed, local authority representatives reserved the right to make representations to the Minister of Fuel and Power on the contents of the Report, and in consequence those authorities are not in any way bound by the contents of the Report.

3. The Post-War Planning Committee's Report contains a Preamble, Part I dealing with Gas and the Fuel Position, Part II Legislation and Integration, Part III Organization and Development, and a Digest.

4. In the Preamble is set out a list of members of the Post-War Planning Committee. Of the fifteen members of this Committee three are officers of local authorities owning gas undertakings, but these officers sit on the Committee in their private capacity and not as representatives of the local authorities. The local authorities, as such, were not invited to be represented on the Committee. The Committee was set up by the Council of the British Gas Federation, which body is a federation of the National Gas Council, the British Commercial Gas Association, the Gas Companies' Protection Association, The Institution of Gas Engineers, and the Society of British Gas Industries. The Council of the British Gas Federation has twenty-six members, twenty-four of whom are elected by the bodies which form the Federation and two are co-opted members. Of the twenty-six members four are connected with local authorities, but members of the Council are elected on their personal qualities and not as representative of local authority or company interests. The Central Executive Board of the National Gas Council consists of members elected by the District Committees of that Council, representatives from the British Commercial Gas Association, the Gas Companies' Protection Association, The Institution of Gas Engineers, and five co-opted members. Out of a total membership of fifty-nine on this Board, fifteen members are connected with local authorities but, here again, the members are elected personally and are not specifically representative of local authority interests.

5. The Preamble refers to the fact that approval has been given in principle to the recommendation that the National Gas Council and the British Commercial Gas Association should be merged in a new and enlarged body to be called "The British Gas Association," the organization and functions of which Association are dealt with in Part III of the Report. It is stated in para. 83 of the Report that the British Gas Association will be financed by the undertakings, each of which will be represented upon the appropriate District Council and that the District Councils will elect a Central Council. It is further stated in this paragraph that the Central Council will set up standing and *ad hoc* boards and committees dealing with specific aspects and problems and separate committees concerned with the particular interests of company and municipal undertakings. Nothing is said in the Report to indicate that representatives of local authorities will be elected as such to the Central Council of the Association.

6. Part I of the Report reviews the Gas Industry factually, and its relationship to the national fuel position. Dealing with the factual aspects of the Gas Industry this part of the Report contains interesting information as to the control of gas undertakings by gas companies and local authorities respectively. Paragraphs 12 and 13 of the Report read as follows:

> "12. In the aggregate the Gas Industry employs, or directly gives rise to the employment of, 250,000 persons. The embarked capital of the Undertakings is £238 million, namely: Statutory Undertakings, £149 million; Municipal Undertakings, £84 million (including £58 million redeemed); non-Statutory Undertakings, £5 million.
>
> "13. At the end of 1937 the Gas Industry comprised 1,079 Undertakings in the hands of 788 owners, namely:
>
> "496 Gas Companies independently owned and supplying 55.9% of the total quantity of gas sold by the Industry.
>
> "310 Gas Companies controlled by 19 Gas Corporations and supplying 9.5% of the total gas sold.
>
> "268 Gas Undertakings owned by Local Authorities and supplying 33.6% of the total gas sold.
>
> "5 Gas Undertakings owned by Joint Gas Authorities and supplying 1% of the total gas sold."

Reference is made in these paragraphs and throughout the Report to "Gas Corporations," this being an alternative description for holding companies.

7. Part II of the Report deals with legislation and integration, and contains the views of the Post-War Planning Committee on the political aspects of replanning the Gas Industry. It is stated in paragraph 46 that the problem of replanning the Gas Industry is "to place the Industry upon such a basis that it can best meet the altered conditions of the future and make the largest possible contribution to national and social welfare."

8. Part II of the Report is divided into three sections: dealing (A) with Legislation; (B) with Geographical Integration; and (C) with Functional Integration. In Section (A) of Part II a plea is put forward for the review and revision of legislation governing the Gas Industry. The main argument in favour of the revision of legislation is based upon dividend and price control, the contention being that price control restricts prices to the smaller consumer below the economic limit, and the loss thus sustained by the undertaking must be recovered by increasing prices to the larger consumers. Paragraph 50 of the Report states that an expert Committee of the British Gas Federation is reviewing, on behalf of the Gas Industry, the statutes relating to gas undertakings, with particular regard to post-war planning and the necessity for the revision and codification of gas legislation.

9. We consider that the legislation governing the Gas Industry is in need of revision. As, however, price and dividend control have in the main been introduced by Parliament to prevent the exploitation of a public service for commercial gain, we consider that the revision of such legislation cannot usefully take place until the reorganized form of the Gas Industry has been settled. We recommend that the Association of Municipal Corporations should reserve the right to make observations on any report which the Committee referred to in the preceding paragraph may issue.

10. Section (B) of Part II, dealing with geographical integration, states that much has already been done towards the co-operation in and the unification of the Gas Industry by the amalgamation of gas undertakings or, in latter years, by the establishment of gas corporations.

11. Paragraphs 61 and 62 are devoted to a condemnation of the nationalization of the Gas Industry, by which term is meant the substitution of some form of State or semi-State ownership and/or management for company and municipal enterprise.

12. Paragraph 64 sets out various methods of geographical integration at present practised, as follows:

> (*a*) Amalgamation or merger of geographically contiguous undertakings, generally by the absorption by a larger undertaking of smaller neighbouring units.
>
> (*b*) Association of gas undertakings under the aegis of a gas corporation, which assumes control by the acquisition of a majority holding of voting capital in companies or, in a few cases, by the outright purchase of municipal undertakings.
>
> (*c*) Joint gas authorities, being the amalgamation in suitable areas of municipal and/or company undertakings, which retain direct control by representation. They are to be distinguished from district gas boards and at present exist only in respect of some municipal undertakings.
>
> (*d*) Transmission companies designed to provide for the large-scale manufacture and/or supply of gas in bulk to undertakings over wide areas, where justified by high concentrations of population.
>
> (*e*) Joint working arrangements between undertakings to increase efficiency and economy in the manufacture and distribution of gas.

13. Paragraph 65 refers to the fact that geographical integration in the past has chiefly taken the form of (*a*) the amalgamation or merger of contiguous undertakings whereby they come directly under the single management of a company, municipality or joint gas authority and operate as a single unit, or (*b*) the association under a gas corporation of undertakings, which remain as separate legal entities, but, whilst retaining their local characteristics, are subject to the control of the Corporation, and states that wherever as a result of the co-ordination, efficiency and economy achieved by these forms of integration, the consumer will receive the best possible service and labour and capital shall be fittingly rewarded, integration by such amalgamation or association should be encouraged and facilitated.

14. Paragraph 66 maintains that it has for long been appreciated that considerable advantages accrue to the public from the amalgamation or merger of geographically contiguous undertakings.

Paragraph 67 speaks in praise of the gas corporation movement as "an expeditious and simple method of integration."

15. Paragraph 68 refers to the fact that at present only one transmission company is in operation, but states that wherever the circumstances make it desirable the establishment of transmission companies should be facilitated. We are of the opinion that if transmission companies are to be established on a large scale they should be publicly owned non-profit-making authorities.

16. Paragraph 69, referring to mutual agreement between gas undertakings for joint working, supports this type of integration as a method of facilitating the subsequent adoption of a closer form of integration.

17. Paragraph 70 refers to the regional supply of gas by District Gas Boards indirectly under the control of the State, and concludes that there is no evidence to show that such an upheaval is called for, or that the extension of present methods of integration would not meet the conditions of the future and better enable the standard of service to consumers to be maintained and developed.

18. Paragraph 71 reads as follows:

> "71. Broadly, the country is served by a large number of medium and small Municipal and Company Undertakings interspersed with relatively few large Undertakings, a noteworthy feature being the harmony and co-operation which exists between Undertakings irrespective of the type of ownership or size. No one of the alternative means of geographical integration of which there is at present experience could be adapted exclusively to meet these varying conditions. Each, however, may be suited to particular areas and circumstances. The matter is specialized and complex, and the problem is (i) to ascertain the needs of the area and the circumstances of each Undertaking, with a view to the introduction of an appropriate form of integration, and (ii) to determine the means by which such integration could best be brought about. In this connexion it should be observed that the general transfer of Company Undertakings to Municipal ownership (or *vice versa*) would, of itself, solve few (if any) of the integrating or other problems of the Gas Industry. The price of gas, for example, is comparable in both Municipal and Company Undertakings, and variation in these or other respects cannot in fact be attributed to the type of ownership. Consequently, the integration proposals in this Report are based upon the assumption that any alteration in ownership should result, not from conformity with a preconceived political formula, but from the adoption of one of the existing methods of integration (paragraph 64) as a means of ensuring, in a particular area, the greatest measure of consumer service."

We do not agree that the general transfer of the Gas Industry to municipal ownership would solve few (if any) of the integration or other problems of the Industry, but on the contrary maintain that many advantages would ensue from such transfer.

19. Paragraph 74 states that the responsibility for bringing about integration must remain with the owners of undertakings, and that the formulation and execution of their plans will be facilitated by the setting up of District Proprietors' Panels which will seek the co-operation of the Ministry of Fuel and Power and the assistance of the British Gas Association. The District Councils of the Association, the Report suggests, will play an essential part in stimulating and guiding geographical integration supported by the Central Council, Statistical Bureau, and other resources of the Association, while para. 75 reads as follows:

> "75. It is recommended that Parliament should appoint a standing Integration Tribunal, to which could be referred any integrating proposal which could not be agreed or to which the Ministry of Fuel and Power withholds consent. All interested parties should have the right to appear before the Tribunal, the findings of which should be final and compliance therewith obligatory, subject to the decision of Parliament on any Bill necessary to implement them. The members of the Tribunal should be independent and judicially competent and they should have the assistance of expert assessors having adequate experience of the Gas Industry. The terms of reference of the Tribunal should be such as are calculated to ensure the greatest measure of consumer service in the area affected by any integrating proposal submitted to the Tribunal."

20. As will be seen from the above synopsis of the paragraphs of the Report dealing with geographical integration, the methods of integration favoured by the Post-War Planning Committee are (*a*) amalgamation or merger of geographically contiguous undertakings, (*b*) purchase by gas corporations, and (*c*) the formation of joint gas authorities. The recommendation contained in para. 75 of the Report (quoted above) clearly implies that integration would be compulsory.

21. The compulsory amalgamation or merger of geographically contiguous undertakings would involve the transfer of many municipal undertakings to companies. At a special meeting of the Association of Municipal Corporations held on July 1, 1937, to consider the report of the Law and General Purposes Committees on the proposals of the McGowan Committee relating to the reorganization of electricity distribution authorities a resolution was passed in the following terms:

> "That in the opinion of the Association in no case should the undertaking of a local authority be transferred to a company."

This resolution is equally applicable to the reorganization of the Gas Industry.

22. The compulsory acquisition of gas undertakings by gas corporations is open to even greater objection from local authorities than absorption by independent gas companies. The integration achieved by gas corporations in the past has in no sense been geographical integration as the undertakings controlled by gas corporations are, in the main, separated by long distances. The holding company system has inherent possibilities of abuse, and it would be wrong for Parliament to enable gas corporations to purchase municipal undertakings compulsorily, or to enable gas corporations to acquire by compulsion a majority holding of voting capital in companies. In our opinion the Report unduly favours gas corporations without drawing sufficient attention to their inherent defects.

23. The suggestion that Joint Gas Authorities might be established, being an amalgamation of municipal and/or company undertakings which retain direct control by representation, is novel in so far as it envisages a joint authority of municipal *and* company undertakings. No details are contained in the Report as to the constitution of such authorities. It is not stated whether such authorities should be run on municipal lines or on company lines, nor whether the authorities would pay sinking fund and interest charges on money borrowed against loan sanctions as in the case of a local authority or raise capital from shareholders and pay dividends in the case of a company. In the absence of more definite information as to the constitution of such joint gas authorities, we do not recommend that this method of integration should be supported.

24. The impression gained from the Report is that the Post-War Planning Committee consider that to a very large extent integration can be brought about by agreement among the owners of undertakings, but that where agreement cannot be achieved integration will be forced upon the owners of undertakings through a decision of the Integration Tribunal, ratified, in cases of necessity, by Parliament. There is no definite proposal in the Report as to what body or authority should be responsible for initiating integration, but there appears to be a suggestion that the British Gas Association and the Ministry of Fuel and Power would initiate and guide integration. Inasmuch as it is envisaged in para. 75 that the Inetegration Tribunal could deal with an integration proposal in respect of which the Ministry withheld its consent, the inference is that the British Gas Association, if it were to be given the power to initiate integration, could, in certain circumstances, override the Ministry. As indicated in para. 5, above, the precise representation of local authority and company interests in the British Gas Association is not made clear in the Report but, having regard to the fact that in terms of gas sold, two-thirds of the Gas Industry is in the hands of companies and one-third in the hands of local authorities, the basis of representation on the British Gas Association is likely to be in the proportion of two company representatives to one local authority representative. As the policy of the large companies, and especially the gas corporations, may be the acquisition of local authority undertakings, the local authorities might be put to great disadvantage if the British Gas Association were to be the body responsible for initiating integration. The bias of such a body would be bound to be weighted in favour of the companies and it could not, therefore, be impartial.

25. The Report envisages the possibility of the compulsory amalgamation of gas undertakings involving the compulsory purchase of some undertakings by other undertakings. Although in para. 73 reference is made to enabling legislation which will be necessary if the execution of integration schemes is to be expedited, no suggestions are made indicating the lines which such legislation should take. As a result of the McGowan Report on electricity distribution, the Ministry of Transport in 1937 prepared a White Paper which was submitted to Parliament and to bodies representing the electricity industry which gave outline proposals to be embodied in a Bill for presentation in Parliament. These proposals laid down suggested schemes for determining the basis upon which undertakings should be acquired when amalgamation takes place, contained a review of distribution districts with suggested possible groupings of undertakings as a basis for consideration which had been prepared by the Electricity Commissioners as an independent body, and recommended that, except where schemes of recorganization were agreed by the undertakers concerned or the individual output of the undertakings proposed to be acquired compulsorily under a scheme did not exceed 10 million units a year, the scheme should not become operative unless confirmed and approved by Parliament. We are of the opinion that if the integration of the Gas Industry is to take place a review of the Industry as a whole must be undertaken by an independent body, and proposals based on the findings of such body should be presented to Parliament with a view to legislation being passed. By this method the views of all sections of the community and the Industry could be taken into account.

26. We consider that the following basic principles should be laid down in order to protect the interests of local authorities in the event of such a review being undertaken. These principles are an adaptation of the principles laid down in the Report of the Association of Municipal Corporations on the McGowan Report and the outline proposals of the Ministry of Transport:

> (*a*) That no local authority should be required to part with the undertaking which they have established under the authority of Parliament unless it is shown conclusively that the consumers

in their area will thereby derive a definite and substantial benefit, and that such result cannot be obtained by any alternative method;

(*b*) that the determining factors to be taken into account in any scheme of amalgamation or reorganization should not be the size of the undertaking, but whether it can attain a reasonable standard of efficiency and be able to afford a cheap and abundant supply of gas both to domestic and industrial consumers;

(*c*) that in all cases where an integration scheme is not agreed by all parties there should be a public inquiry at which local authorities, whether undertakers or not, should have a right to be heard and that the scheme, unless agreed, should be provisional only and should not be operative until confirmed by Act of Parliament.

27. The Report of the Post-War Planning Committee deals inadequately with the possibility of the complete transfer of the Gas Industry to public ownership through the democratic forms of local government, as the only reference to this aspect of the matter appears in para. 71 of their report quoted above. In the letter of June 28, 1943, by the British Gas Federation to the chairmen of gas undertakings the following extract from a speech by the Prime Minister on March 21 last appears:

> "A number of measures are being and will be prepared which will enable the Government to exercise the balancing influence on development which can be turned on or off as circumstances require. There is a broadening field for State ownership and enterprise, especially in relation to monopolies of all kinds."

These remarks have been taken by the Post-War Planning Committee to refer solely to national or State ownership as distinct from municipal ownership. While the question of national ownership is a rather vexatious political question, there are many people of all shades of political opinion who would be prepared to support the transfer of all public utility undertakings to local authorities. We consider that by failing to deal adequately with the possibility of the transfer of the Gas Industry to public ownership through the democratic forms of local government, the Post-War Planning Committee have not carried out the request of the then President of the Board of Trade, as mentioned in para. 1 of our report, and we consider that the transfer of the Gas Industry to local government ownership demands earnest consideration.

28. In paragraph 54 of the Report it is stated that gas is a modern social necessity, and reference is made in other parts of the Report to the necessity of placing the Gas Industry upon such a basis that it can best meet the altered conditions of the future and make the largest possible contribution to national and social welfare. We agree that gas is a modern social necessity, and consider that the Gas Industry should be organized and operated as a social service for the benefit of the community rather than for commercial gain. Local authorities already own and control with conspicuous success other public utility services such as passenger transport services, electricity, and water supplies, and are well fitted to control services of this nature. The policy of the Association of Municipal Corporations in regard to public utilities was stated in their Report on the Reorganization of Local Government, which was adopted by a general meeting of the Association on July 23, 1942, as follows:

> "Public utilities should, as a general statement, be owned and controlled by the public through the democratic forms of local government which, in effect, means that the undertakings at present owned by local authorities should be retained by them subject to general supervision through the appropriate Government Department whose duty it would be to secure the requisite degree of co-ordination and efficiency. Should it happen, in consequence, that the services area, or area of supply, extends outside the area of the owning authority into that of another, this should not be regarded as a predominant reason for altering the area of supply or for adjusting the area of the local authority. In appropriate cases the system of bulk supply should exist; the function of generation (in the case of electricity and gas) or collection (in the case of water) might be separated from the function of distribution. These services may, in fact, by the course now recommended, be placed upon an approximation to a regional basis; 'regional' in this case implying an area economical and efficient for the administration of such services."

29. Local authorities are in a position to run public utility undertakings as social services because they operate their undertakings on a non-profit-making basis. Further, local authority undertakings are backed financially by the general rate fund of the authority and capital is raised at low fixed rates of interest on the security of all the revenues of the authority, thus enabling the services to be provided at the cheapest cost.

30. The changed conditions which the Gas Industry will have to face in post-war years will more than ever necessitate the Industry being run solely as a social service without financial gain. The replanning of densely populated districts will result in the rapid development of rural areas requiring an extension of public utility services to those areas regardless of whether the load is likely to command a profit (see Report of the Committee on Land Utilization in Rural Areas, paragraph 166). The provision of services in such circumstances is practised extensively by local authorities.

31. Municipal undertakings are in a strong position financially to meet the demands which are likely to be made upon them and, as municipal ownership is synonymous with public ownership, those responsible for formulating the policy of the undertakings are able to consider those demands from the point of view of the public interest.

32. Once it is recognized that a supply of gas is a social service it follows that the paramount consideration in regard to all questions relating to that service should be the public interest. It is difficult for the directors of an undertaking owned by a company to make the public interest their paramount consideration in view of their duty to the shareholders to safeguard dividends.

33. Local authorities are almost universally the street lighting authority for their area, and the provision of street lighting at cheap rates is greatly facilitated where a local authority also owns the gas and electricity undertakings.

34. Smoke abatement powers are vested in local authorities for the purpose of improving the health and amenities of the people in their areas, and where local authorities own the gas and electricity undertakings, the policy of these undertakings in displacing raw fuel can be more easily co-ordinated with the local authorities' smoke abatement policy.

35. The supply of gas and electricity by a local authority cheaply and efficiently and the stimulation of the use of gas and electricity by industries in the local authority's area can have a great effect on increasing the industrial prosperity of the area, resulting in higher employment, a better standard of living and working conditions, and an improvement in the general welfare of the people in the local authority's area, all these being matters which are the particular concern of the local authority.

36. Although in contradistinction to electricity undertakings there is no general power for local authorities compulsorily to purchase gas undertakings in their areas, s. 162 of the Public Health Act, 1875, gives urban authorities powers to purchase by agreement the undertaking of a gas company supplying gas within their district, and certain Private Acts establishing gas companies contain clauses authorizing local authorities to purchase the undertakings compulsorily. Parliament has therefore for a number of years envisaged the possibility and propriety of gas undertakings being vested in municipalities.

37. If the single all-purpose local authorities recommended by the Association of Municipal Corporations are to be established, such authorities would in certain cases form convenient units for the ownership and control of the gas undertakings in their areas. The possibility, however, of the area of one single all-purpose local authority not being a convenient or economic unit for the gas undertaking should be envisaged. In such cases the problems might be met either—

(*a*) By the single all-purpose local authority supplying gas outside its municipal boundaries; or

(*b*) by two or more single purpose local authorities combining together for the joint ownership of a gas undertaking; or

(*c*) by one single all-purpose local authority supplying gas in bulk to a number of other authorities.

We consider, however, that wherever possible the single all-purpose local authority should be the owner of the gas undertaking, as it is found in practice that the joint ownership of a public utility undertaking will deprive the consumers and ratepayers of the area in question of many of the financial advantages which are derived from local authority ownership and also of the advantages to be gained from the retention of local interest.

38. Each area should be reviewed individually, as in some localities this type of organization might not be appropriate owing to the peculiarities of the boundaries of existing gas undertakings, or the desirability of the development of gas supply in remote rural areas which are far removed from a single all-purpose local authority. In these cases the gas undertaking could be vested in a gas board on similar lines to the North of Scotland Hydro-Electric Board.

39. In the event of the Gas Industry being transferred to the local authorities it would be essential for the authorities to join together in an association for the purpose of—

(*a*) Standardizing methods and systems;

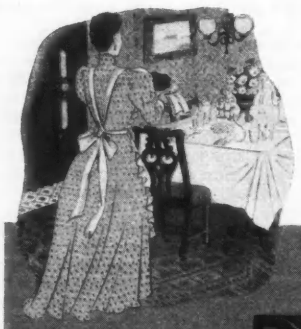
(*b*) co-operating in research; and

(*c*) training of personnel for the Industry.

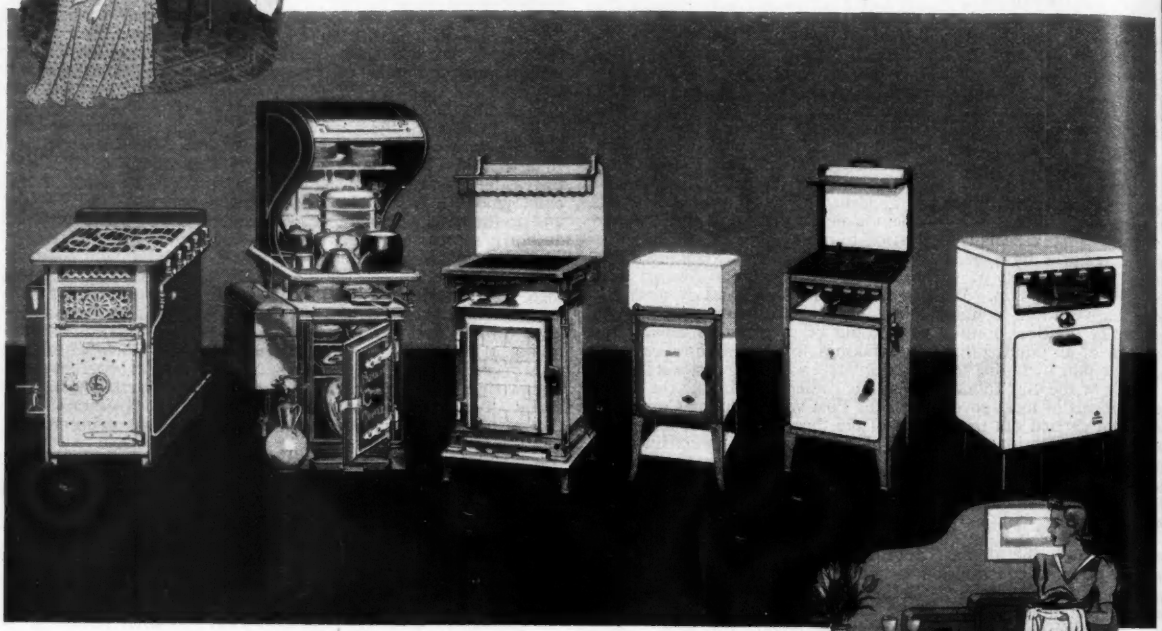
40. We recommend the adoption of our report, and that it should be forwarded to the Minister of Fuel and Power and all members of the Association.

41. In accordance with the instructions we have received from the Special Committee of which we are a Sub-Committee, we propose to prepare a further report on the question of the public ownership of the Gas Industry.

The Third Conference on "X-Ray Analysis in Industry" has been provisionally arranged to take place in Oxford on March 31 and April 1 under the auspices of the X-Ray Analysis Group of the Institute of Physics. Details will be circulated shortly to members of the Group and will be sent to non-members on application to Dr. H. Lipson, F.Inst.P., Honorary Secretary of the Group, c/o Crystallographic Laboratory, Free School Lane, Cambridge. The Conference will be open to all interested, but it may be necessary to limit the number of non-members of the Group for whom accommodation can be provided.



EVOLUTION...



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THE MANUFACTURER AND THE GAS INDUSTRY*

By H. R. HEMS,

Superintendent, Industrial Heating Section, City of Birmingham Gas Department, and Chairman, Industrial Gas Centres Committees

(*Continued from vol. 242, p. 789*)

The parts are passed on a moving heat-resisting steel belt through the hardening furnace, and fall through an oil-jacketed chute into the oil quenching tank. The belt is moved by motor-driven variable speed gear, and furnace temperature controlled by automatic temperature controller; conditions necessary for the hardening of small or large parts of different steel compositions can, therefore, be readily obtained. The quenching oil tank is water-jacketed, and a circulating pump ensures that cool oil is delivered beneath the outlet of the delivery chute, where the steel parts are picked up on another steel mesh belt and transferred to the degreasing tank.

This is a long steel tank containing degreasing solution maintained at 200°F. by six tubular immersion type heaters fitted along the side of the tank. A steel mesh belt collects the parts from the oil quench tank, and conveys them through the degreasing fluid to the tempering furnace.

Two types of tempering furnace have been evolved and selected according to the shape of the steel part to be treated. The first type consists of a heated rotating drum with special internal guides, and is suitable for most work but not for parts which, because of shape, might become attached to guides or other parts. For the latter, the more orthodox conveyor belt is used. Both are speed and thermostatically controlled. The well known "speed nut," springs, machine gun bullet clips, nuts and bolts, &c., are examples of work treated.

Details were recently taken over a day of the output of one of these furnaces. This is maintained through the night at a low temperature, and at 7.30 a.m. the operator sets the temperature controllers to the working temperature and lights up the degreasing tank. By 8 a.m. the unit has reached the desired temperature, and test pieces are put through which by 8.30 a.m. have passed through the entire line. Hardness figures are taken, and if satisfactory, normal production proceeds.

0.8 carbon steel rings, 3 in. in diameter (weight approximately ¾ oz., 22 to 1 lb.), were placed five abreast and four rows per foot length on the 16 in. wide belt travelling at 1½ ft. per minute. This gave an hourly throughput of 1,800 pieces (total weight approximately 80 lb.). The length of belt travel through the furnace is 6 ft. 6 in.; therefore each part was raised to the hardening temperature of 790°C. in four minutes.

From these figures, and operating from 8.30 a.m. to 5.30 p.m. (one hour for lunch and ½ hour break morning and afternoon), the operator could load approximately 13,000 parts during the day, representing a total weight of 600 lb. In practice, however, as the furnace operator has to load the furnace, make periodical checks on hardness, and remove filled boxes from the discharge end, the normal day's output is usually 10,000 parts, or between 4–5 cwt. of steel.

The tempering furnace is automatically controlled at 400°C., and has a flat belt conveyor with an effective heated length of 14 ft. The belt moving at approximately 16 in. per minute traverses the entire length in 10½ minutes, and is adjustable to suit the weight of the individual parts passing through.

Parts as small as ¼ in. diameter, weight 1 gramme, up to 5 in. diameter, weight 2½ oz., are treated.

Scale formation is negligible. For the "shut-down" and "full-on," gas rates are adjusted to give the smallest difference, thus ensuring minimum alteration of the composition of combustion gases in the hardening chamber, and flue dampers are set to give a reducing atmosphere and a furnace pressure. This, together with the very short time during which the work is in the furnace, practically prevents "scaling"; a very thin scale is formed, but is removed during the oil quenching and degreasing, and the finished product at the outlet of the tempering furnace is quite clean.

The maximum gas rates of the various units are as follows:

Hardening furnace . . .	600	cu.ft. per hour.
Degreasing tank . . .	500	„ „
Tempering furnace . . .	480	„ „

These are, of course, "full-on" gas rates, but the hourly gas consumptions or maintenance rates depend on the weight of charge passing through the line.

Light Alloys

One of the most important potential demands for gas furnace plant will come from the light metal industries—incidentally, subject to the most intense competiton—for the heating prior to forging or rolling and heat treatment of the various aluminium alloys which are so prominent a feature of aircraft and automobile work.

The bulk melting and maintaining of aluminium and its alloys has been dealt with very fully in the past. Important development work has been taking place recently on the heat treatment of these alloys—annealing at 350°–420°C., solution treatment at 500–530°C. according to alloy, and precipitation (age hardening) treatment. The treatments need extreme care and accuracy of temperature control, a margin of 5°C. only being allowable, otherwise work is scrapped by not passing the requisite physical tests.

The familiar salt bath and recirculated air furnaces are widely used to meet these requirements, and from many possible instances I will quote details of a recirculated air furnace used for the solution treatment of one important alloy as an illustration of what is required not only in the way of general control of temperature, but also to show that even temperature control within fine limits over a very large volume of working space can be obtained from the modern gas-fired oven designed for this class of work.

This plant was installed in an important factory by Controlled Heat and Air, Ltd., and designed as an air circulation unit to accommodate a basket 7 ft. 6 in. high by 4 ft. diameter, and comprises an inner and outer mild steel casing, the inner casing being specially designed to allow free movement for expansion, and the space between the inner and outer casings being filled with Moler insulating powder, thickness 12 in. At points in the casings openings are provided for supply and recirculating duct connexions, and round these openings the insulation is by means of Moler "Economite Grade" insulating brickwork.

The combustion chamber is external to the working space and is fired by multijet luminous burner. With its supporting steelwork it is situated below ground level, the steelwork being extended to carry a centrifugal type fan placed immediately above the combustion chamber.

The distribution system inside the furnace casing comprises two supply headers located adjacent to the combustion chamber, together with a recirculating header. The supply headers carry semicircular limbs, each with its separate damper control, these limbs being designed with high velocity slots throughout the entire length to ensure air movement across and through the work. The slots are adjustable throughout their entire length. The recirculating header is complete with proportioning sliding plate dampers, and it will be appreciated that the complete circulating system, both on the supply and recirculating sides, is completely flexible, and permits of adjustment to ensure equal temperature conditions throughout the whole of the load space. The final temperature head is limited due to the large volume of air in circulation, and it is possible, therefore, to ensure that control temperature is not exceeded, since there is no possibility of thermal storage in the design, though the unit is thermally highly efficient and, consequently, when the control comes into operation the effect is immediately felt on the load.

A flame failure control is fitted in this unit and a push-button station is fixed. The furnace is fitted with a specially designed lid-lifting unit, and is also complete with an electrical hoist, runway, and quench tank.

The unit was designed for maximum temperatures of the order of 550°C., the working temperatures being between 495°C. and 535°C., and the difference when working at these temperatures does not exceed plus or minus 3°C. at any part of the working chamber. This is substantiated by comprehensive tests made on this plant by the metallurgist in charge in order to ascertain temperature distribution and the rate of heat penetration for large and small forgings. With the kind permission of the firm concerned, I am able to give particulars of one of the tests carried out to determine uniformity of temperature.

In this test the load, consisting of forgings, was placed in the several trays with a thermocouple in contact with the work in each tray, and two further thermocouples in the incoming and return air streams. Four test pieces were arranged round the circumference of each tray. The total weight of the load was 1 ton 1 cwt., and the furnace was at 530°C. when the load was charged.

After a period of 1½ hours, when the automatic temperature control first operated, the incoming air temperature was 535°/540°C., the return air 514°/518°C., the couple in the top tray 509°C., while the couples in contact with the work in the other trays all lay between 517°C. and 522°C. After a further hour, the top tray couple showed 519°C., while those in the other trays were between 527° and 532°C. During the remaining two hours of the treatment period these temperatures did not vary more than 2°, and at no time during this period was any temperature observed in the lower six trays lying outside the limits of 527°/532°C. At the end of this period the incoming air temperature was 532°C., and the return air 525°C. The couple in the top tray remained at 519°/521°C., this lower temperature being due to the fact that this tray is immediately under the lid of the furnace. As a result of the information gained from this test, the top tray is not now used for production purposes.

The test pieces showed very uniform and satisfactory results, with those from the top tray slightly lower than the others.

Light Alloys—Chain Conveyor Type Light Alloy Slab Re-Heating Furnace

In this furnace, built by Messrs. Gibbons Brothers, Ltd., two streams of slabs are carried through on two separate conveyors, each independently driven. Each conveyor is driven at the discharge end by driving sprockets cast on heat-resisting metal drums revolving on

* Paper to the Scottish Junior Gas Association (Eastern District).

(With acknowledgments to the Architects, Messrs. Seth-Smith, Munro and Matthew.)

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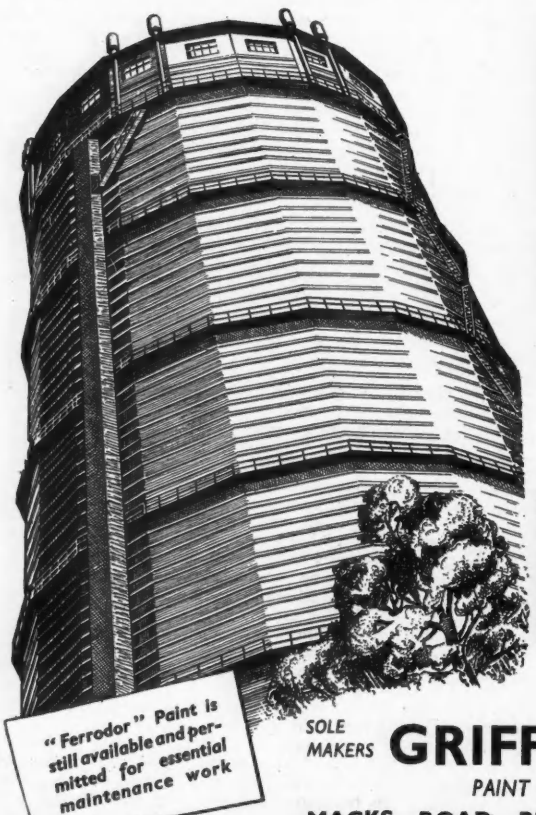

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stationary shafts, the speed of the chain conveyors being regulated to suit the period of heating required.

The furnace is heated by a series of square refractory muffle chambers, or radiants, disposed transversely across the floor of the furnace, each being heated by a town gas burner at one end, the further end being arranged so that the waste gases can be passed either direct into the heating chamber or by-passed into the waste gas chimney flue. To ensure uniformity of heating, a number of electrically-driven recirculating fans are arranged in the roof.

The furnace is divided into two heating zones, the temperature of each being separately and automatically controlled by pyrometers. On later designs the number of separately controlled zones has been increased.

A similar furnace, 50 ft. long, deals with 3 tons per hour of duralumin slabs 39 in. by 19 in. by 5 in. thick. At this output the furnace requires a fuel consumption of 3,930 cu.ft. per hour of town gas having a calorific value of 470 B.Th.U. per cu.ft. This consumption is equivalent to 0.588 cu.ft. of gas per lb. of duralumin heated.

Food Production

The use of gas in food-producing industries was making considerable headway up to the outbreak of war, and many fine installations of gas furnaces and plant for biscuit making, sweet and confectionery manufacture, potato crisps and bread baking can be quoted. Probably bread baking, owing to its importance in the war effort, is at present making the greatest demand for gas, and I venture to predict that this will continue after the war, even when the availability of other fuels is easier.

The possible demand for gas lies in two directions—the conversion of existing ovens and the installation of new plant. As an example of the former, the following particulars, given by the Liverpool Centre, of a conversion are submitted as a typical instance:

"The oven, which is of the continuous conveyor steam tube type, is so designed that the loaves being fed from the proving chamber pass to the top of the oven and, after travelling through four heat zones along the top of the oven, finally pass down to a lower level before being taken out of the oven completely baked. Each heat zone is heated by a burner firing into a separate combustion chamber which, in turn, is connected to a common flue led to atmosphere.

"The four gas burners fitted were of simple jet type, each passing 1,000 cu.ft./hour at a pressure of 25/10 in., and were in turn mounted on a swivel joint complete with a quadrant gas cock. The swivel joint enabled the gas burners to be swung out and the firing hole closed when the oven was shut. This type of burner gives a luminous flame about 3 ft. in length, and enables a fairly high degree of temperature uniformity to be maintained—a condition which is necessary for this type of oven. Combustion was complete at the base of the combustion chambers, and hot products only pass over the tubes, the ends of which protrude into the upper portion of the combustion chamber. The flue damper was adjusted to give a slight pull and was locked in position.

"When the conversion took place it was realized that the hearth of the combustion chamber needed re-bricking, which was later carried out when the oven was shut down for a fairly long period; the secondary air ports in the hearth of the combustion chamber were then enlarged slightly, giving a better heat distribution and satisfactory flue gas analysis.

"The oven has been in continuous use for 15 months and has given every satisfaction. The hours of working are about 60 per week. The following figures give some indication of the results obtained:

"Sackage per week	520	.	362
Gas used per week	1279.2 therms	.	1028.08 therms
,, per sack	2.46 ,,	.	2.84 ,, ,,

As an example of new plant, the following is an installation, details of which have been given by Messrs. Baker Perkins, Ltd.: Two square Scotch Bread baking ovens, fitted with high-pressure gas direct burning equipment, are each 100 ft. long by 9 ft. 8 in. wide and have an output of 15 sacks of bread per hour.

A "Cyclotherm" bread oven, 75 ft. long by 9 ft. wide. In this system of gas firing three burners only are used, fired by high-pressure gas, and has an output of twelve sacks per hour.

Many installations of gas fired peel and drawplate ovens can be referred to, and on these, with the conveyor ovens already mentioned, gas consumptions from one and a half to four therms per sack of bread baked are being obtained, the variation taking place according to the size of the oven, the type of bread baked, and the hours of working.

The Yorkshire Centre have also given me some interesting particulars on the use of gas on Mawcroft Farm, Guisley (Yeadon and Guisley Gas Company), for a number of processes which include central heating of the farmhouse, domestic hot water, greenhouse heating, steam raising for the mashing of pig food, grass drying and grain drying. The largest and most interesting pieces of equipment are the grass dryer and grain dryer.

The Grass Dryer

Originally the grass dryer was fired by means of oil fuel, the products of combustion passing through a hot gas fan to the drying chamber. Conversion to gas firing was accomplished simply by removing the oil burner and replacing it by an induced draught gas burner.

The process was of the batch type, and the farmer decided to adopt continuous methods by substituting a rotary machine with a three-pass dryer using the same air heater. A number of fires occurred, traced to incandescent particles passing over from the furnace and igniting the dried grass.

The furnace was redesigned and a new burner, consisting of a nozzle-mixing air blast burner with flame retention tip, and the hot gases made to pass through a cyclone in order to precipitate any particles of material prior to their passage through the fan to the dryer. There have been no fires since this modification was made. Furthermore, the efficiency of the plant has been increased.

Performance figures are extremely difficult to assess on grass dryers owing to the variable moisture content of the ingoing grass. This often reaches 80% or more. However, the modified dryer requires some 900 cu.ft. of gas per cwt. of dried grass compared with 1,100 cu.ft. of gas per cwt. for the old method. The maximum throughput for average conditions would be about 3 cwt. of dried grass per hour. The hot gas temperature at inlet to dryer is about 160°C. The maximum gas rate per hour for the burner is 4,000 cu.ft. per hour.

It may be mentioned that the product often passing through the dryer is quite green and very brittle. It is milled to a fine meal and bagged ready for transport.

The Grain Grower

This plant uses an air heater similar to the one now in use on the grass dryer and consists of two vertical chambers built on the outside of a hot air chamber, which is fitted with perforated sides. The external casings of the vertical chambers are also perforated. Hot air from the heater enters the diffusing chamber, passes through the grain and away to atmosphere. Lower down the dryer chamber, a similar diffusing chamber admits cold air with which to cool the grain prior to its discharge into bags.

The overhead hoppers are kept filled by means of an elevator, and the drying chambers are always kept full. Rate of flow is controlled by means of variable speed rockers, which spill the grain over weirs at the bottom of the drying chamber and thence into hoppers for bagging.

The initial moisture content of the grain is 26%; this is reduced to 14½% in the dryer. Gas used is 600 cu.ft./hour for a throughput of 10 cwt. per hour. The plant can handle up to one ton per hour.

Note.—C.V. of gas: 475 B.Th.U. cu.ft.

Gas used on grass dryer for 1942: 3,000,000 cu.ft.—May to October.

These propositions have been quoted to reveal possible demands where gas supplies may become available in rural areas.

The instances of installations I have selected now appear to be all concentrated on fairly large sized furnaces. I do not want to lose sight of the demands which are being made and are likely to continue to be made for the smaller batch type furnaces and the developments which are taking place in connexion with them, particularly in the use of the latest insulating refractory materials and improved doors, leading to greater economy in gas consumption.

Among the smaller applications, there are many of vital interest and with possibilities of very large consumptions in the aggregate; for instance, the development of radiant heating (infra-red) drying. I cannot at present add any more detailed information to that contained in the paper read by Mr. Andrew and Dr. Chamberlain, of the Gas Light and Coke Company, before the Institute of Fuel, which has now been published, except to say that the Gas Light and Coke Company, Birmingham, and other Centres are receiving a large number of enquiries for this type of plant, and experimental runs have been carried out to prove its value for the various drying propositions under consideration. Where single-line production can be adapted, this process is showing big possibilities with the increased speed of drying claimed for it, in comparison with the more familiar batch or continuous drying ovens. Installations are already being completed, and one, to my knowledge, has just been put through its preliminary trials with every success.

From the Cardiff Centre I have received information regarding the application of gas to polish manufacture. From the Manchester Centre in connexion with large scale or commercial heating a very interesting installation of laundry equipment, including a battery of clothes-drying horses, which has been completed in a large block of flats. The Bristol Centre has notified me of a recent installation of high-temperature panels for works heating.

Messrs. Brayshaw Furnaces and Tools, Ltd., have installed many gas-fired furnaces for tempering and annealing processes, high-speed steel hardening with controlled atmospheres, and also rotary carburizing furnaces suitable for either solid or gaseous carburizing media. From the newly-formed Scottish Centre I have no full details of any one installation, but from information received it appears that the applications your undertakings are receiving cover general heat treatment processes, wire annealing, and several of those to which I have already referred, also some textile work, and what are new to me, fish de-freezing and fish-curing.

You will expect some reference to the work of the Industrial Gas Centres with which I am proud to be associated. I should like first, however, to refer to the industrial gas work of the Birmingham Gas Department, which has been my chief interest for many years.

(To be continued)

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GAS PRODUCTS PRICES

The London Market Jan. 3.

All Coal Tar Products are in good demand, and Pitch in the London area remains about 45s.

The new Coal Tar Products Prices Order, 1943 (S. R. & O. 1528), came into force on Nov. 15, fixing the prices at which Coal Tar Oils may be sold for various specified purposes. It also confirms the prices which may be charged for other Coal Tar Products under earlier Orders.

An Order entitled The Control of Toluene (No. 3) Order, 1943 (S. R. & O. 1943, No. 976), came into force on July 20, and introduced certain changes in the prices for different grades of Toluene.

There are no changes to report in the prices of Coal Tar Products.

The Provinces Jan. 3.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 11d. to 2s. 1d., pure, 2s. 7½d. (controlled by the Control of Toluene No. 3 Order, dated July 14, 1943, operative from July 20, 1943). Naphtha and Xylole controlled by the Coal Tar Naphtha and Xylole Order, 1943, dated May 31 (S. R. & O., 1943, No. 768), operative from June 1. Carbolic acid, 60's, naphthalene, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil controlled by the Coal Tar Products Prices Order, 1943, dated Oct. 20, 1943 (S. R. & O. 1943, No. 1528), operative from Nov. 15, 1943.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Scotland Jan. 1.

Year has closed with demand continuing strong. Refined tar*: Yield to Distillers is 4½d. per gallon *ex* Works, naked. Creosote oil: Timber preserving quailty,* 5½d. to 6½d.; hydrogenation oil,* 5⅞d.; low gravity or virgin oil,† 7¼d. to 7½d.; benzol absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha†: 6½d. to 7d. per gallon. Solvent naphtha*: Basic prices delivered in bulk, 90/160 grade, 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d.; Rectified 2s. 3d. per gallon. Pyridine†: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

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